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(54) Billiard cue with hollow body and foamed core

(57) A cue, particularly a billiard cue, comprises a rod (12), a head (13) and a pad or tip portion (11), the rod (12) being made by rolling plies of fibre reinforced plastics material (14-19) into a hollow body and then introducing a foamed composition to form an axial core (20).

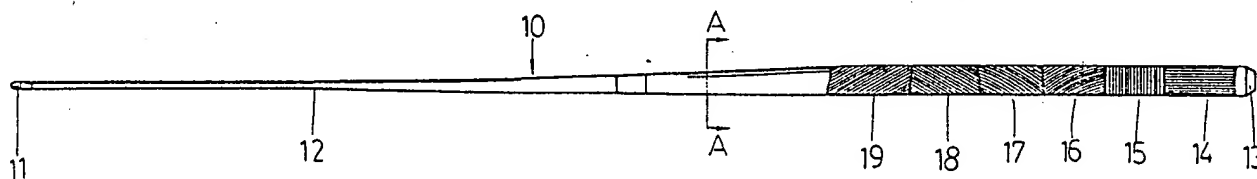


FIG 1

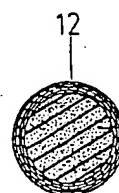


FIG 2

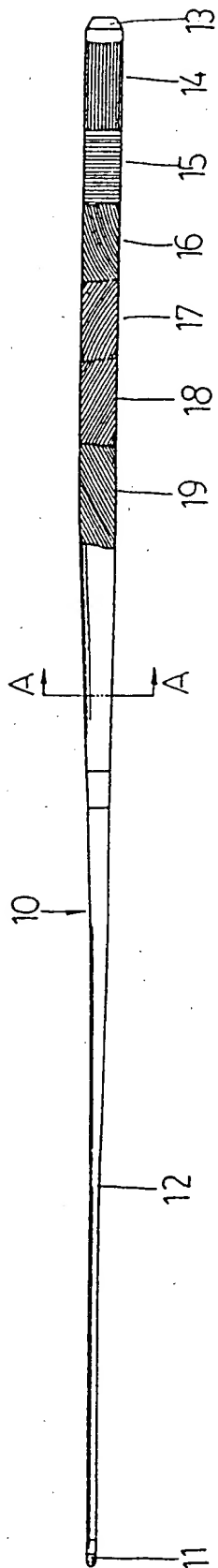


FIG 1

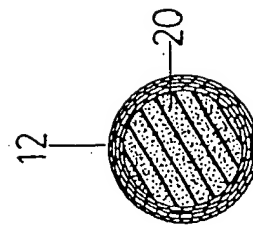


FIG 2

## SPECIFICATION

## An improved cue

- 5 This invention relates to a cue, particularly to a billiard cue.

Known billiard cues are usually made of wood. However differing densities and moisture content commonly cause wooden products to warp, or even crack. The efficiency of a billiard cue, as well known, depends on the central axis at all portions thereof being kept in one straight line.

- 10 However, a wooden billiard cue once warped will cause the centre points of cross-sections thereof not to lie on one straight axial line. Another reason for the known billiard cue not to operate well is the weight variation of the cue itself. The cue which is not stable in weight will cause the user difficulty in adjusting himself to achieve a consistent -  
20 performance.

An object of this invention is to provide an improved cue which minimises the risk of warpage.

- Any other object of this invention is to provide an improved cue which minimises variations in weight  
25 over a long term.

- The present invention provides a cue comprising a rod, a head at one end of said rod and a pad or tip portion on the opposite end of said rod wherein said rod is made by rolling a plurality of plies of fibre reinforced plastics material into a hollow body and then causing a foamed composition to be introduced into said hollow body to form an axial core.

- 30 There will now be described an example of a cue according to the invention. It will be understood that the description, which is intended to be read with reference to the drawings is given by way of example and not by way of limitation.

In the drawings:-

- Figure 1 is a perspective view of a preferred embodiment of this invention, portions of which are shown broken away;

Figure 2 is a cross sectional view taken on the line A-A of Figure 1.

- The example shown depicts a billiard cue. Figure 1 shows a preferred embodiment of the invention wherein a cue 10 comprises pad or tip portion 11, a rod 12 and a head 13. The tip portion 11 and the head 13 are conventional in construction. The rod 12 is made by rolling six plies of fibre reinforced plastics material into a hollow body as will be explained below.

- The broken away portions of Figure 1 show that a first ply 14 and a second ply 15 of the fibre reinforced plastics material are wound so that the directions of grain diverge from each other at an angle of 90°, a third ply 16 and a fourth ply 17 deviate from a centre axial line by 30° in opposed directions and therefore from each other at an angle of 12°, and a fifth ply 18 and a sixth ply 19 deviate from the centre axial line by 45° in opposed directions and therefore from each other at an angle of 90°.

All six plies of fibre reinforced plastics material 14, 15, 16, 17, 18 and 19 are pliable during the process of rolling and are not yet hardened

fibre reinforced plastics material 14, 15, 16, 17, 18 and 19 are subjected to heat and pressure so that they may be moulded into shape.

- The rod 12 has a better resistance against warping due to the plastics material and the arrangement of the fibre reinforced plastics plies 14, 15, 16, 17, 18 and 19.

- As shown in Figure 2, after the rod 12 is rolled into a hollow body and further moulded into shape, a foamed composition such as polyurethane (PU) may be formed therein by a moulding technique to form an axial core 20.

- The quantity and density the foamed composition required depends on the desired weight of the cue  
80 10.

The foamed composition may be formed in a layer on the innermost side of the rod 12 before the latter is moulded into shape and then simultaneously subjected to heat and pressure.

- 85 CLAIMS

1. A cue comprising a rod, a head at one end of said rod and a pad or tip portion on the opposite end of said rod wherein said rod is made by rolling a plurality of plies of fibre reinforced plastics material into a hollow body and then causing a foamed composition to be introduced into said hollow body to form an axial core.

2. A cue according to Claim 1 wherein the hollow body is subjected to heat and pressure in order to mould it into shape.

3. A cue according to Claims 1 or 2 wherein said fibre reinforced material comprise six plies.

4. A cue according to Claim 3 wherein a first ply and a second ply of said fibre reinforced plastics material diverge from each other in an angle of 90°, a third ply and a fourth ply deviate from a centre axial line by 30° in opposed directions and therefore from each other at an angle of 120°, and a fifth ply and a sixth ply deviate from the centre axial line by 45° in opposed directions and therefore from each other at an angle of 90°.

5. A cue constructed and arranged substantially as hereinbefore described with reference to and as shown in the drawings.